This slide presentation was presented at the May 3, 2004 Coyote Creek Shear velocity Comparison Workshop at the USGS, Menlo Park, CA.

This is an extract from Asten, M.W., and Boore, D.M., eds., Blind comparisons of shear-wave velocities at closely spaced sites in San Jose, California: U.S. Geological Survey Open-File Report 2005-1169. [available on the World Wide Web at http://pubs.usgs.gov/of/2005/1169/].

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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Utah State University
Shear Wave Velocity Profiles at Coyote Creek Borehole using SASW Method

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Outline

- Testing Equipment
- Testing Method
- Analysis Method
- Testing at Coyote Creek Borehole
- Testing at Williams St. Park

Equipment

Low-Frequency Wave Source

- Trailer Mounted
- 4500 lb Drop Weight
- Inertial Force Measurement
- Designed for Profiling 30-60 m

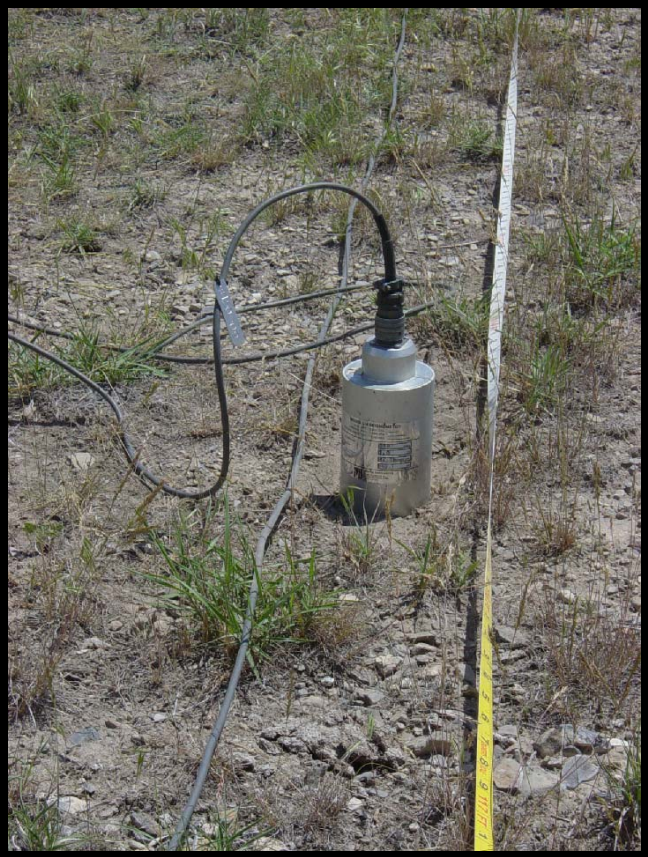
Rubber Pads

- Protect Ground Surface
- Enrich Low Frequency Waves

High-Frequency Wave Source

- 8-lb Sledge Hammer
- Integral Force Transducer

Sensors



- 1-Hz Seismometers

Data Acquisition/Field Analysis

- HP 35670A Dynamic Signal Analyzer
- 4-Channels

Testing Method

- Source Correlation
- Disregard Waves Longer Than 2 Times Source to Receiver 1 Distance
- Reverse Wave Directions When Possible

Source Correlation

- Calculate Transfer Function from Source to each Sensor
- With Averaging, Non-Correlated Energy is Eliminated
- Coherence Function Becomes Reliable Indicator of Data Quality
- Requires Instrumented Source

Analysis Method

- Used Program WinSASW
- Iterative, Manual Forward Modeling
- Complete Wave Solution for Theoretical Dispersion Calculations

Coyote Creek Borehole

Date Tested: 9/11/03

Spacings (ft): 150, 100, 75, 50, 25, 20, 10, 8, 4

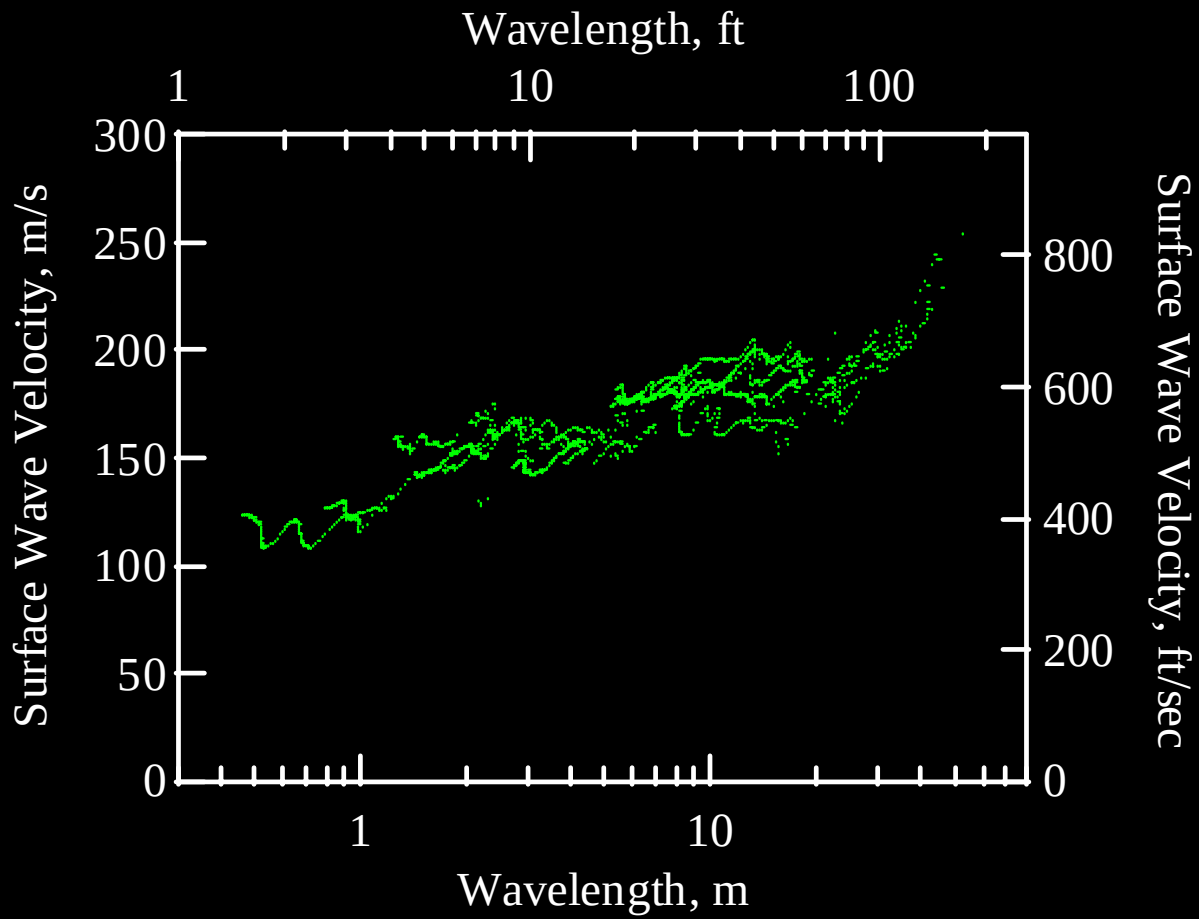
One direction only with drop weight, forward and reverse directions with hammer source

Drop surface: asphalt

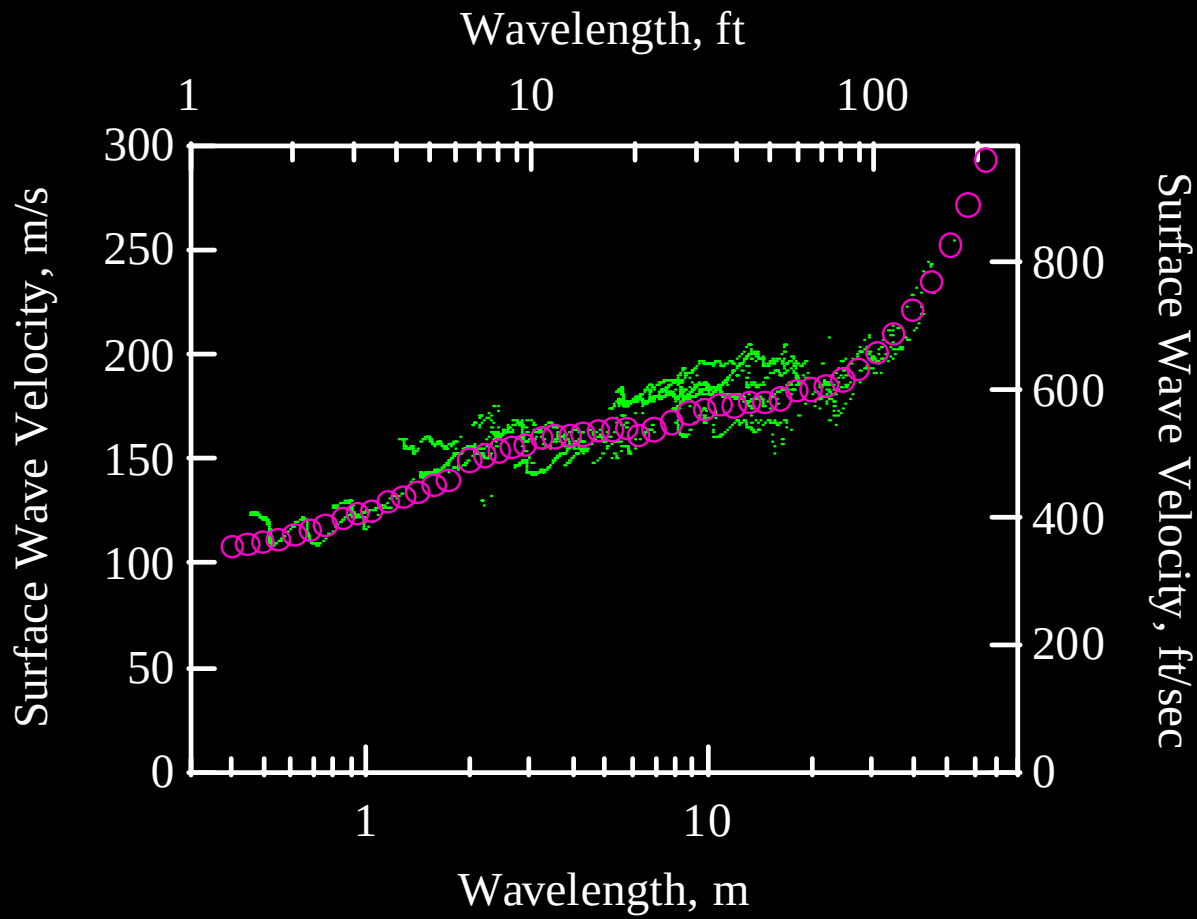
Padding Height: 7.5 inches

Drop Heights: 3 inches

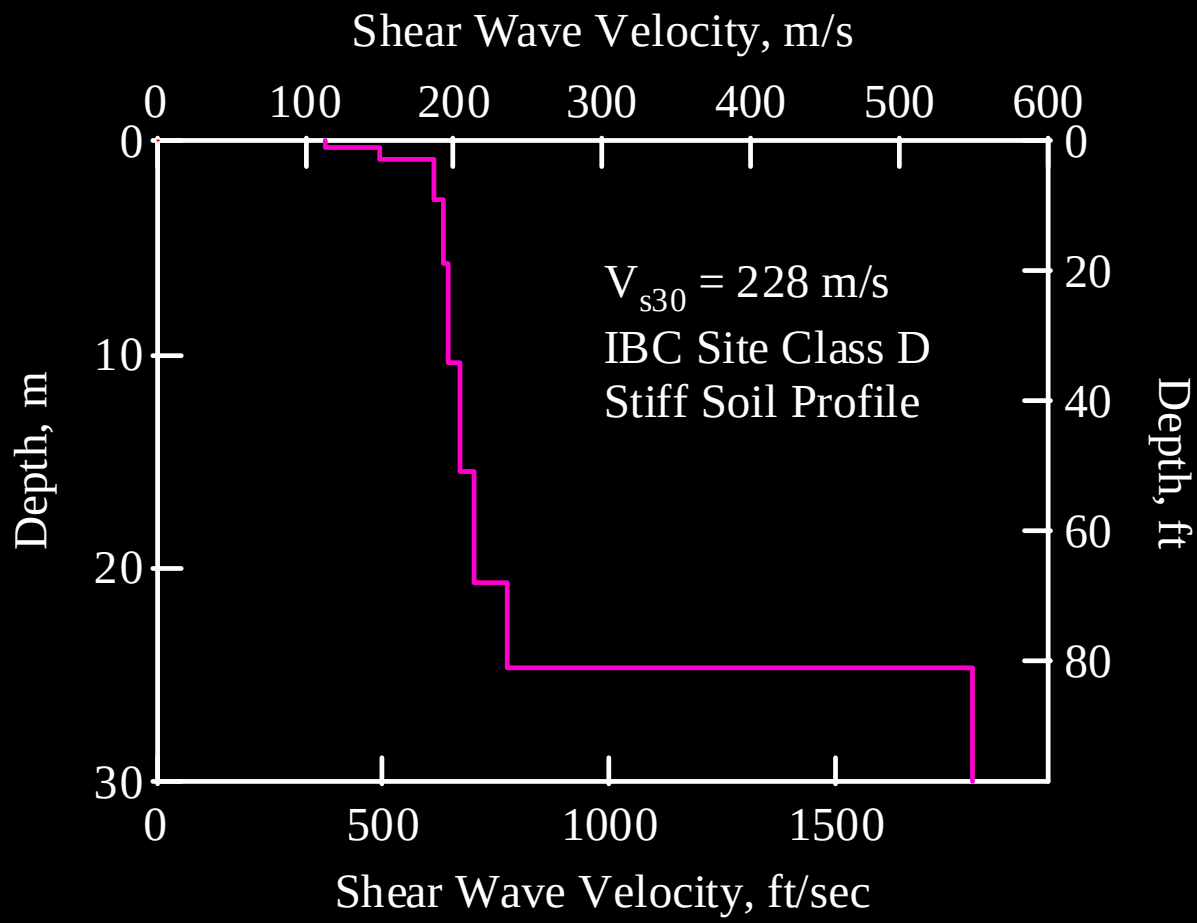
Coyote Creek Experimental Dispersion Curve



Coyote Creek Experimental and Theoretical Dispersion Curves



Coyote Creek Shear Wave Velocity Profile



Coyote Creek Shear Wave Velocity Tabulated Profile

Depth to Top of Layer (m)	Layer Thickness (m)	Shear Wave Velocity (m/s)	Assumed P-Wave Velocity (m/s)	Assumed Unit Weight (t/m^3)
0.00	0.34	114	214	1.89
0.34	0.55	149	279	1.89
0.89	1.83	186	348	1.92
2.72	3.05	194	362	1.92
5.77[a]	4.57	197	1524	1.92
10.34	5.18	204	1524	1.92
15.5	5.18	213	1524	1.92
20.7	3.96	236	1524	1.92
24.7	30.18	549	1524	2.00

Williams Street Park

Date Tested: 9/11/03

Spacings (ft): 200, 100, 50, 25, 20, 10, 8, 4

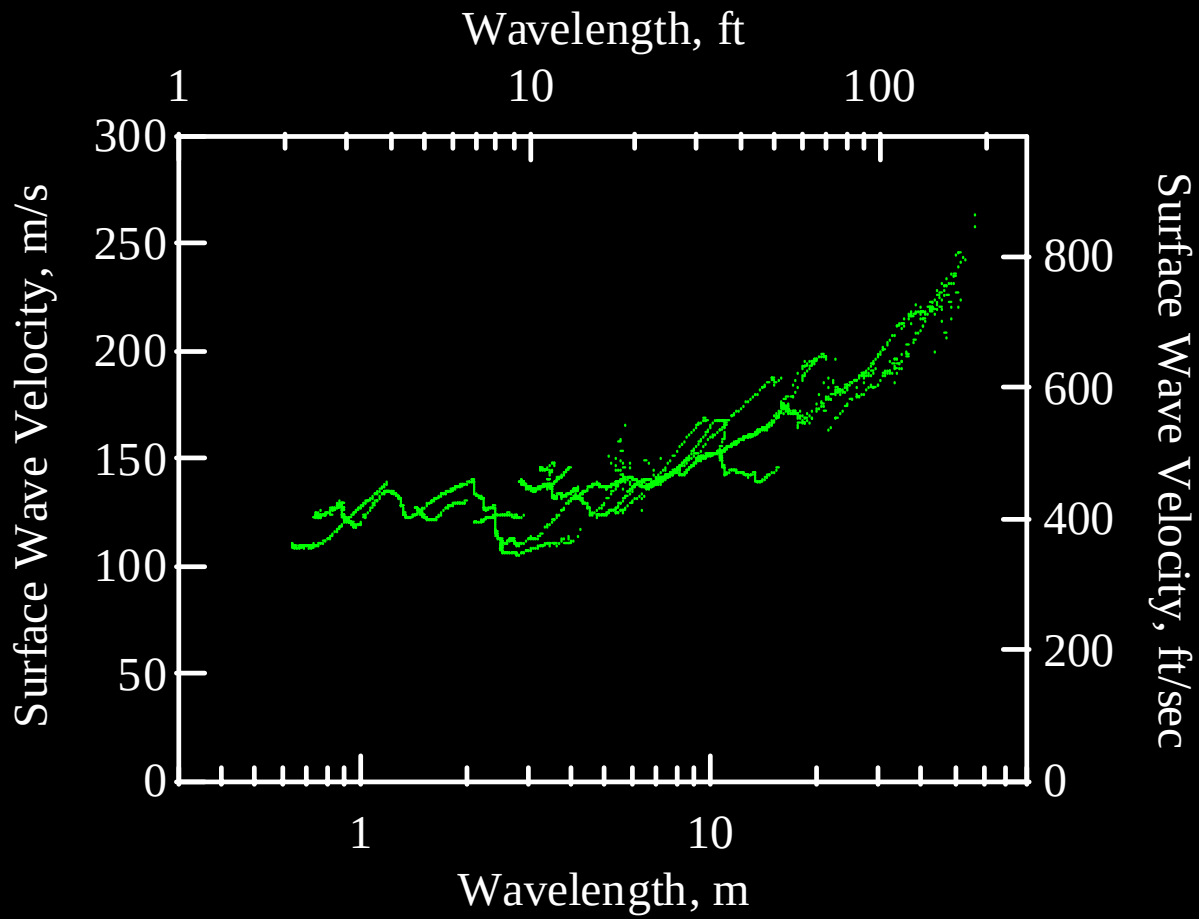
Forward and reverse directions with drop weight and hammer

Drop surface: turf

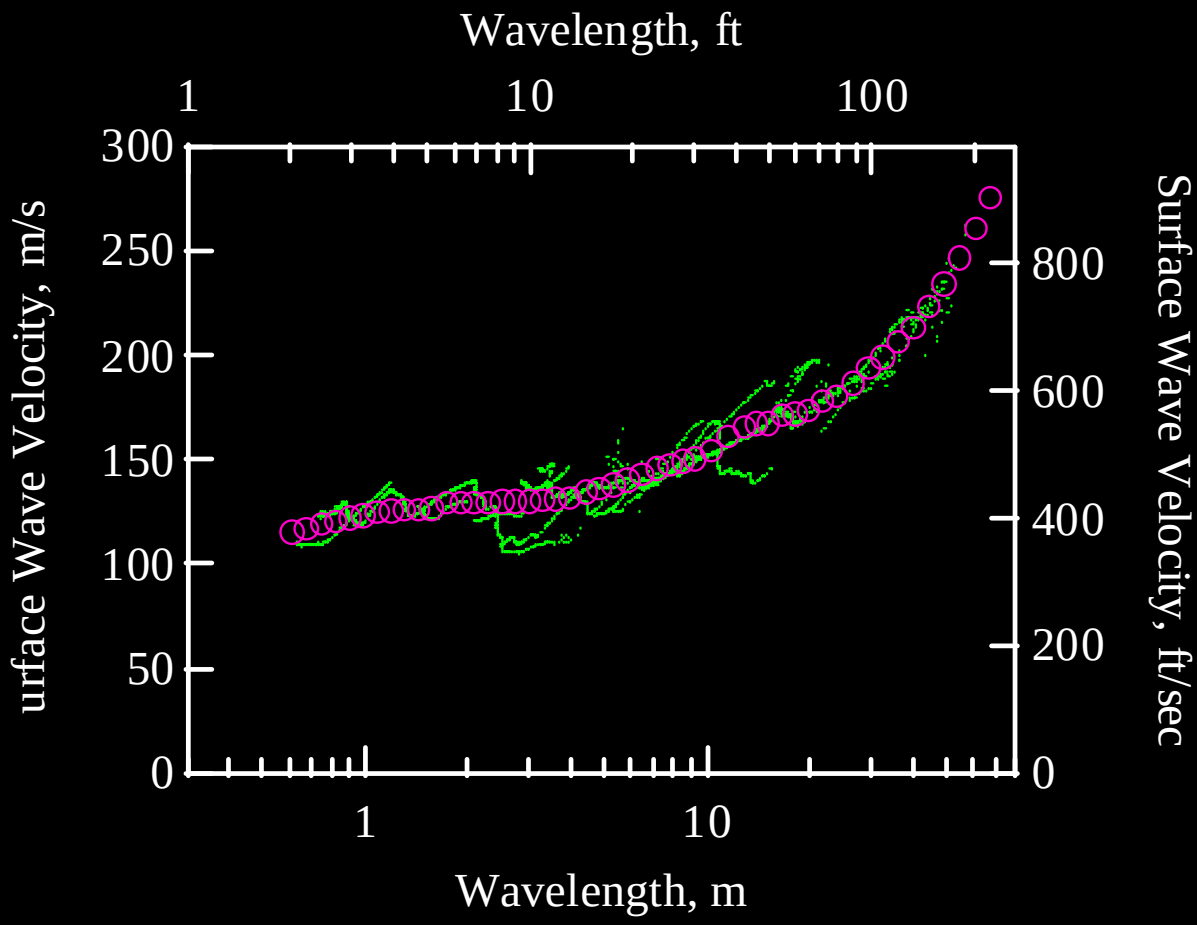
Padding Height: 7.5 inches

Drop heights: 4 inches

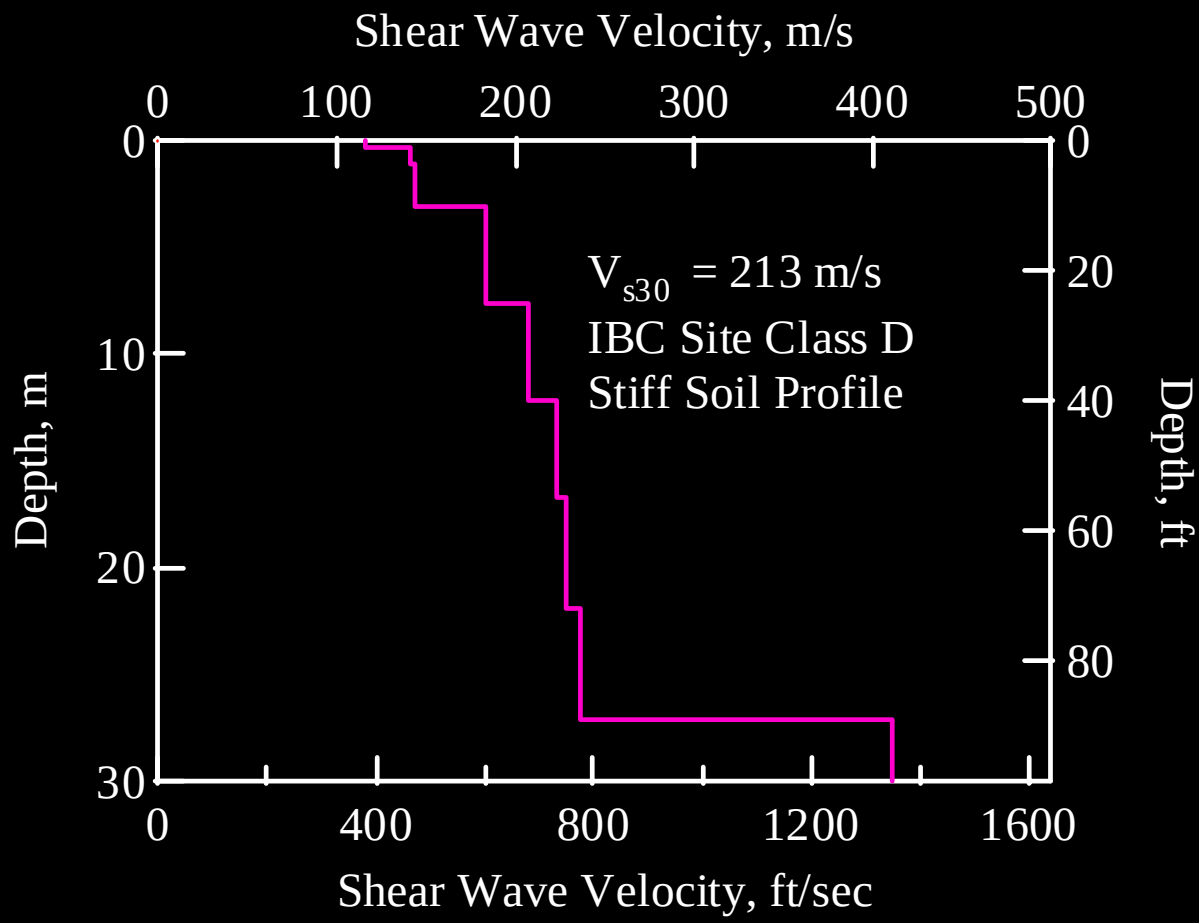
Williams St. Park Experimental Dispersion Curve



Williams St. Park Experimental and Theoretical Dispersion Curves



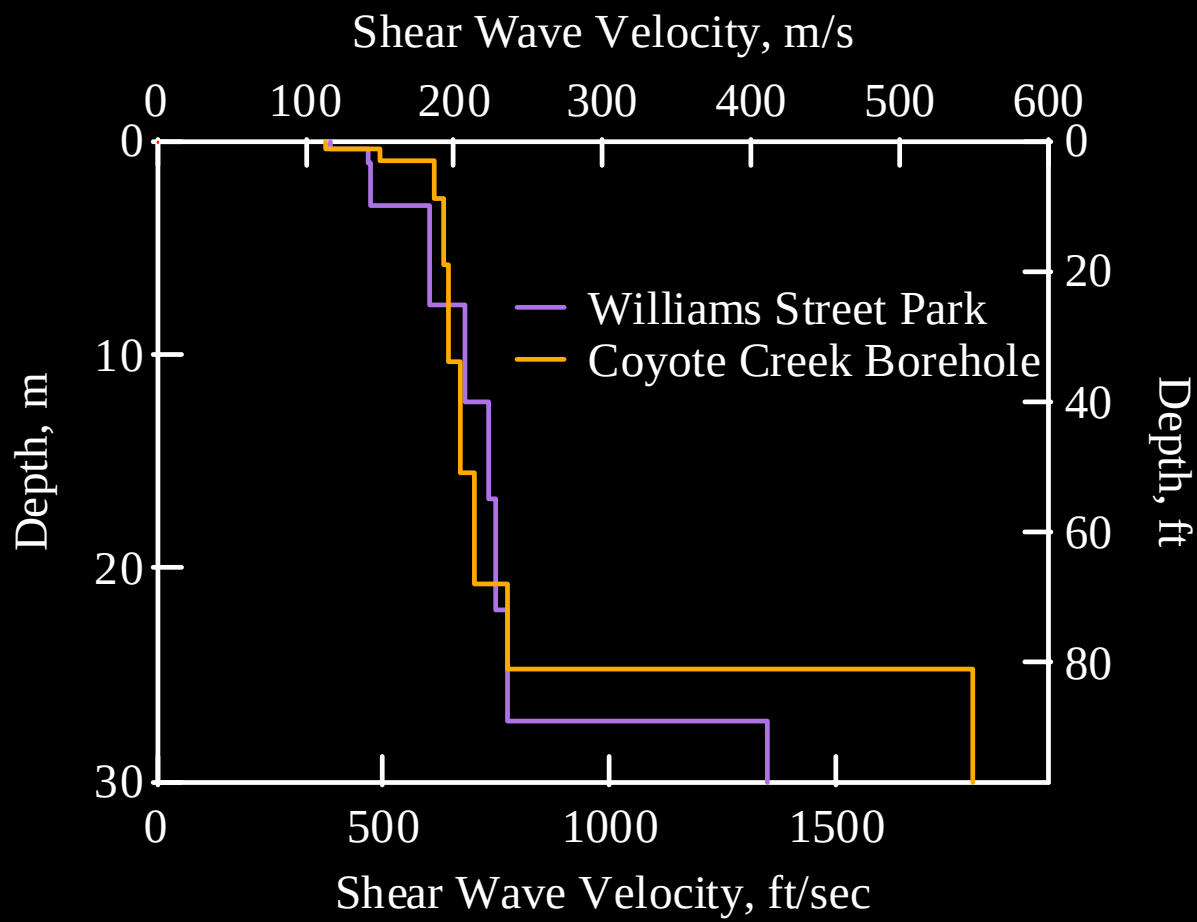
Williams St. Park Shear Wave Velocity Profile



Williams St. Park Shear Wave Velocity Tabulated Profile

Depth to Top of Layer (m)	Layer Thickness (m)	Shear Wave Velocity (m/s)	Assumed P-Wave Velocity (m/s)	Assumed Unit Weight (t/m^3)
0.00	0.30	116	217	1.89
0.30	0.76	142	265	1.89
1.06	1.98	143	268	1.89
3.04	4.57	183	342	1.92
7.61[a]	4.57	207	1524	1.92
12.2	4.57	223	1524	1.92
16.8	5.18	229	1524	1.92
21.9	5.18	236	1524	1.92
27.1	30.18	412	1524	2.00

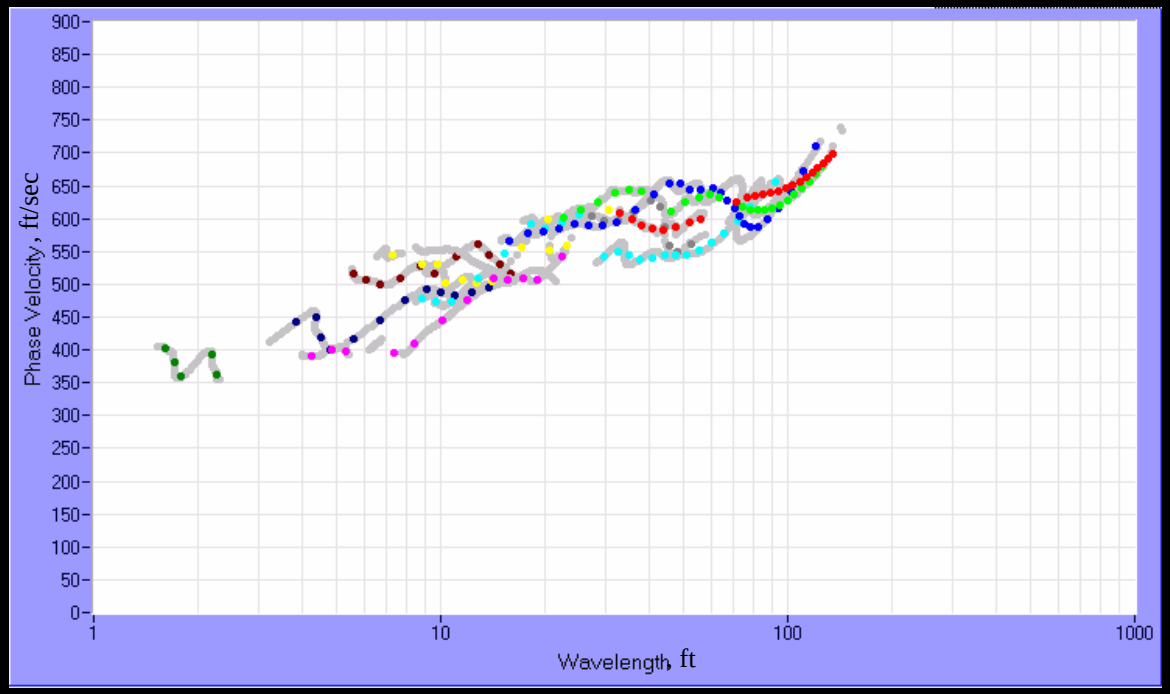
Comparison of Between Sites



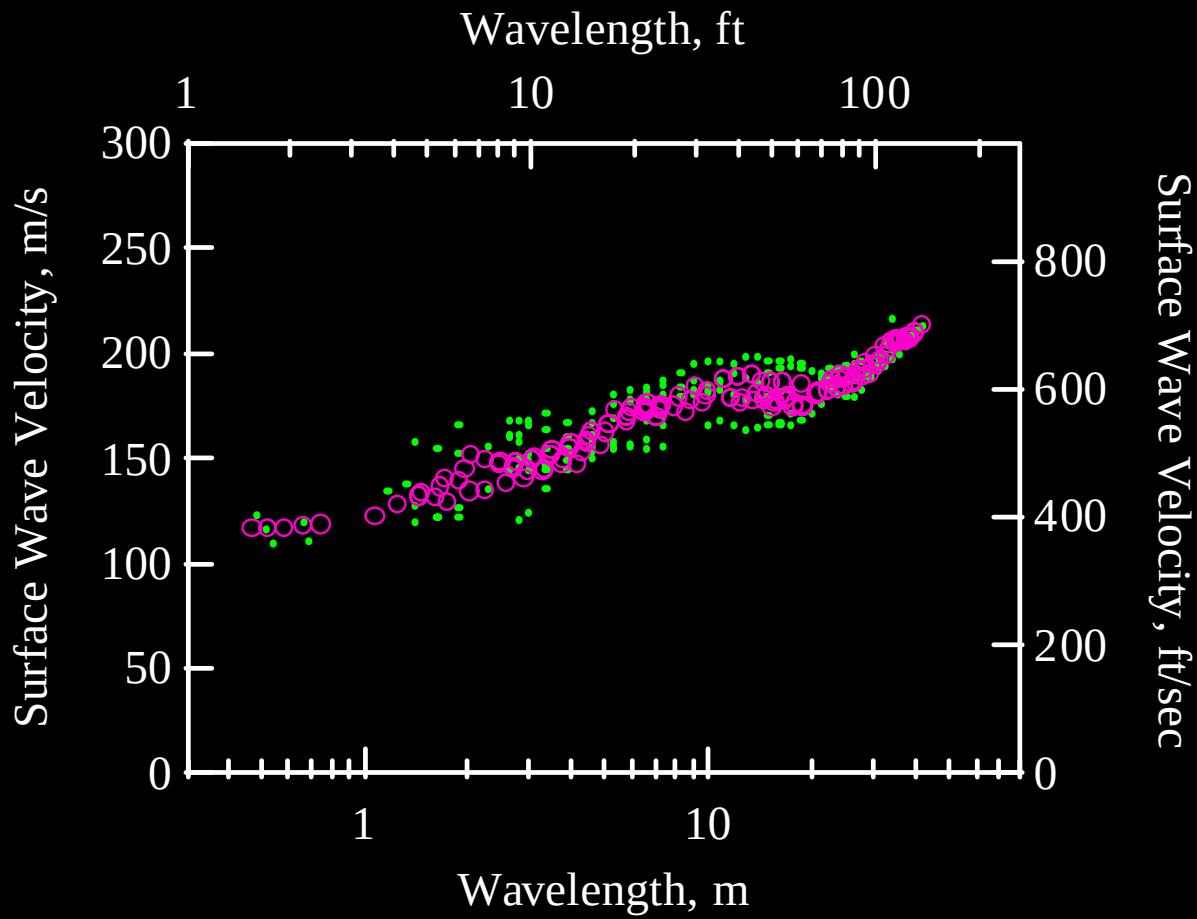
Questions?

Coyote Creek Automated Analysis

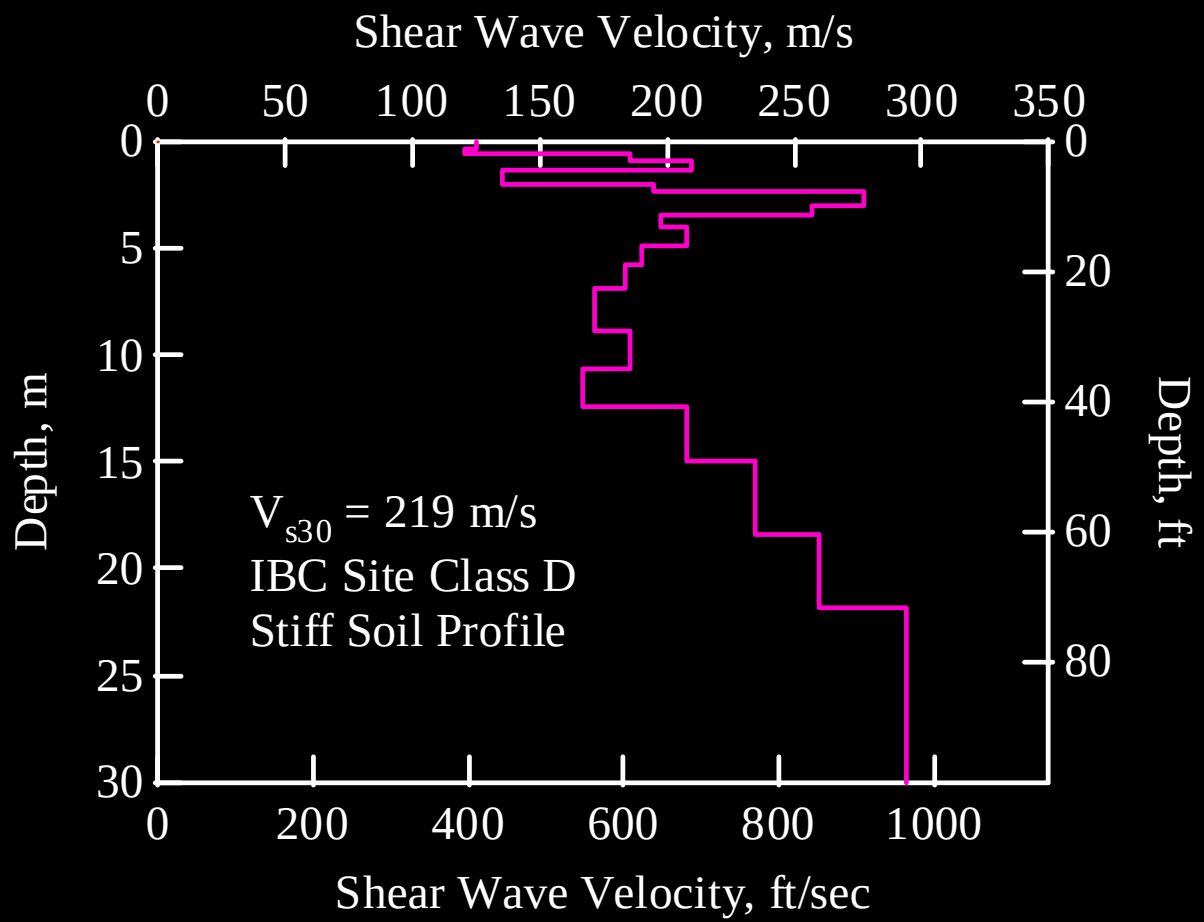
Coyote Creek Automated Experimental Dispersion Curve



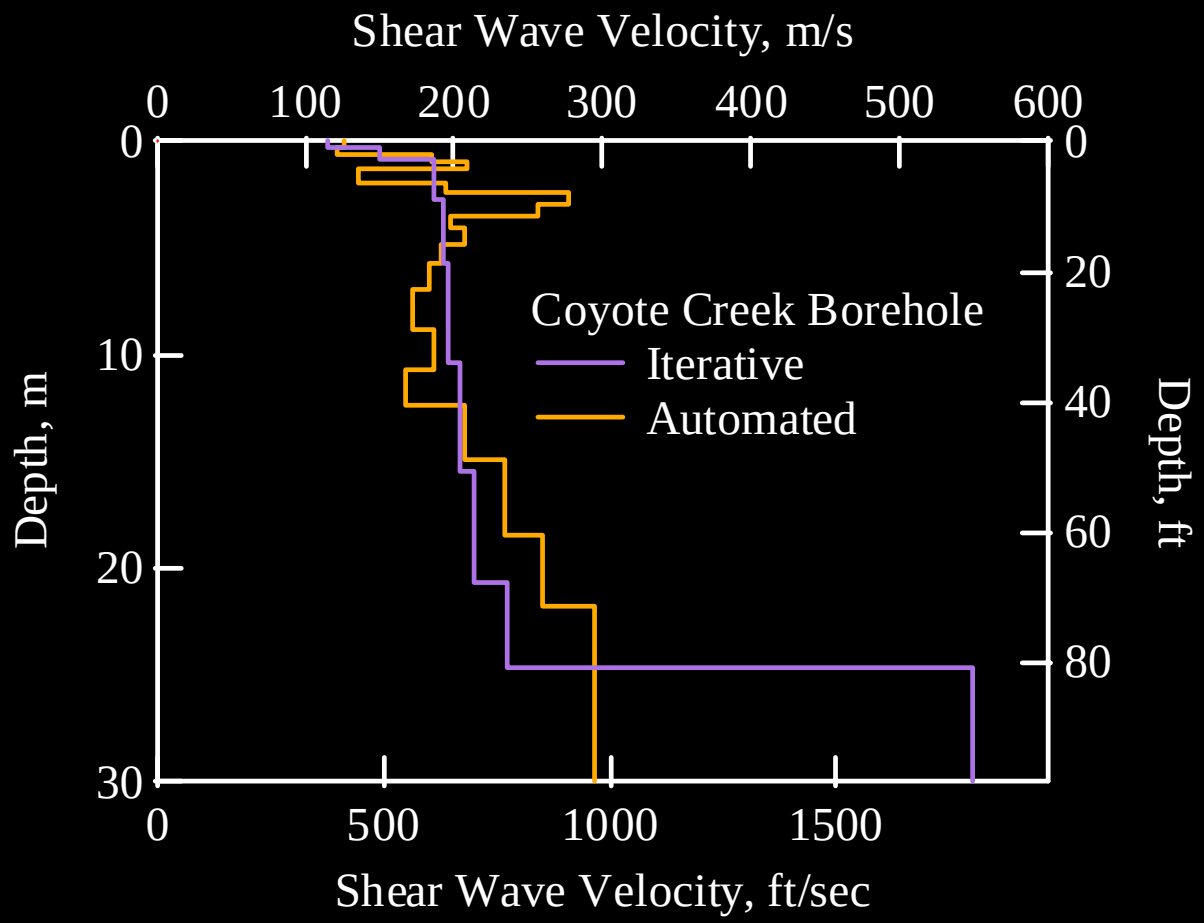
Coyote Creek Automated Theoretical Dispersion Curve



Coyote Creek Automated Shear Wave Velocity Profile

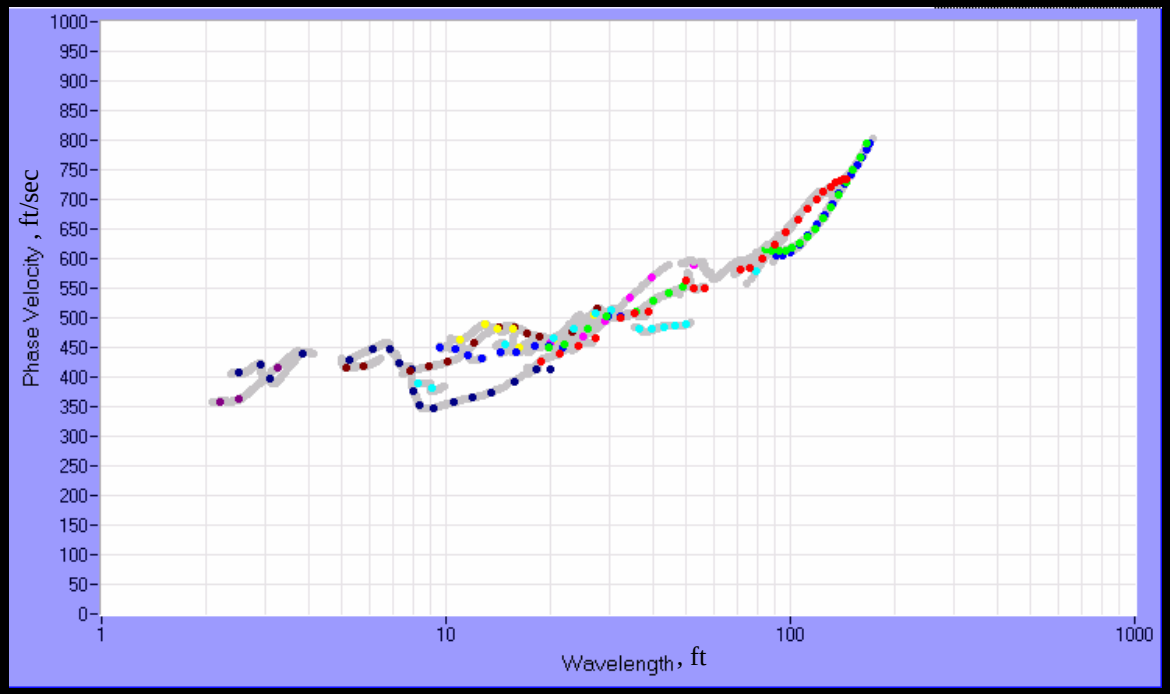


Comparison of Analysis Methods at Coyote Creek

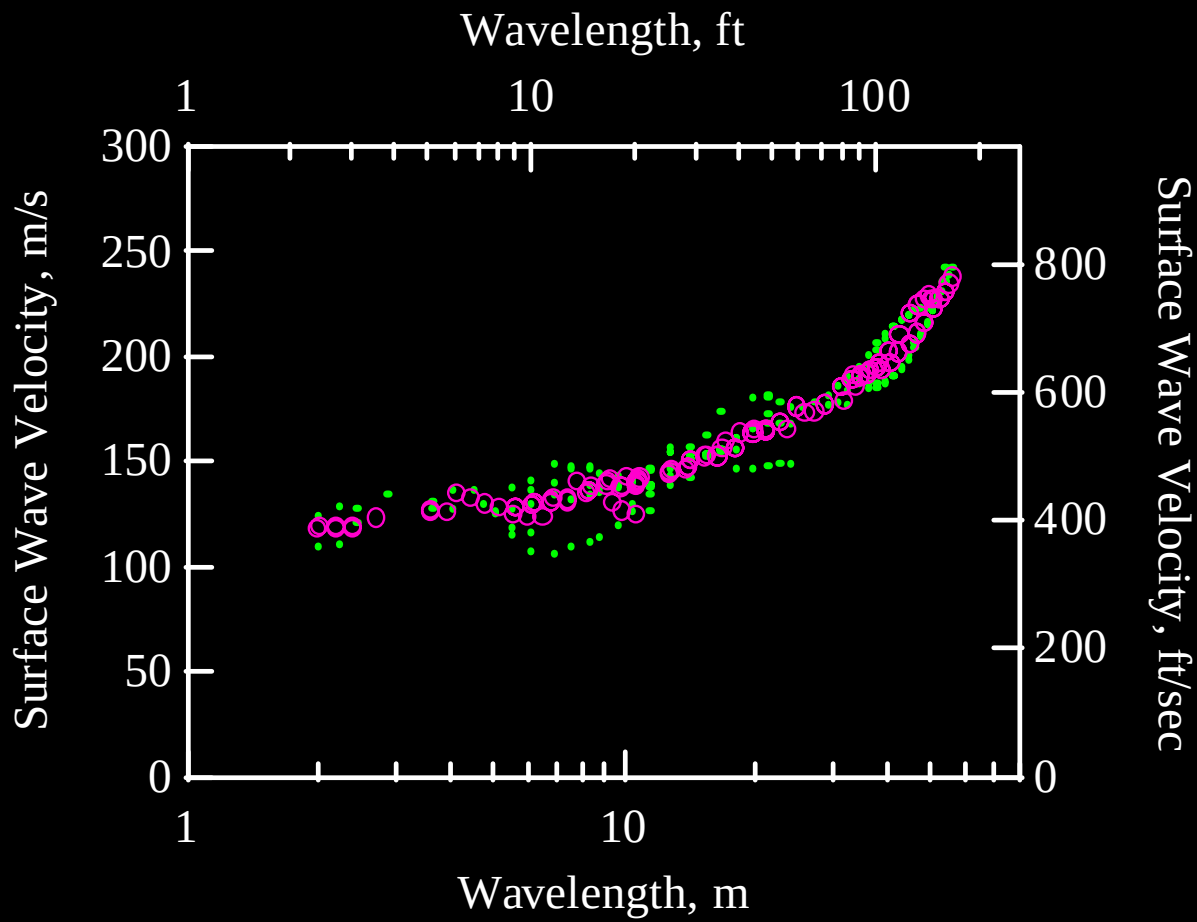


Williams St. Park Automated Analysis

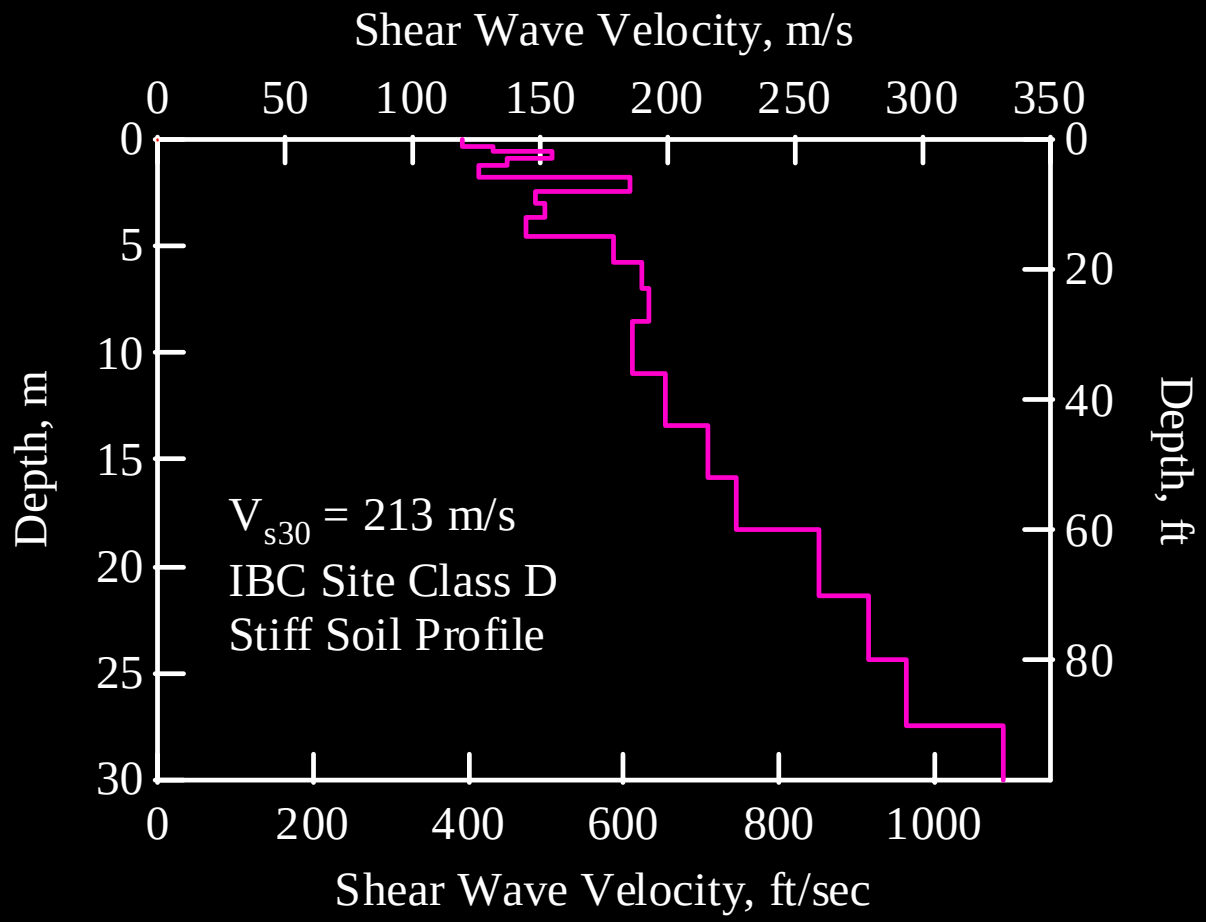
Williams St. Park Automated Experimental Dispersion Curve



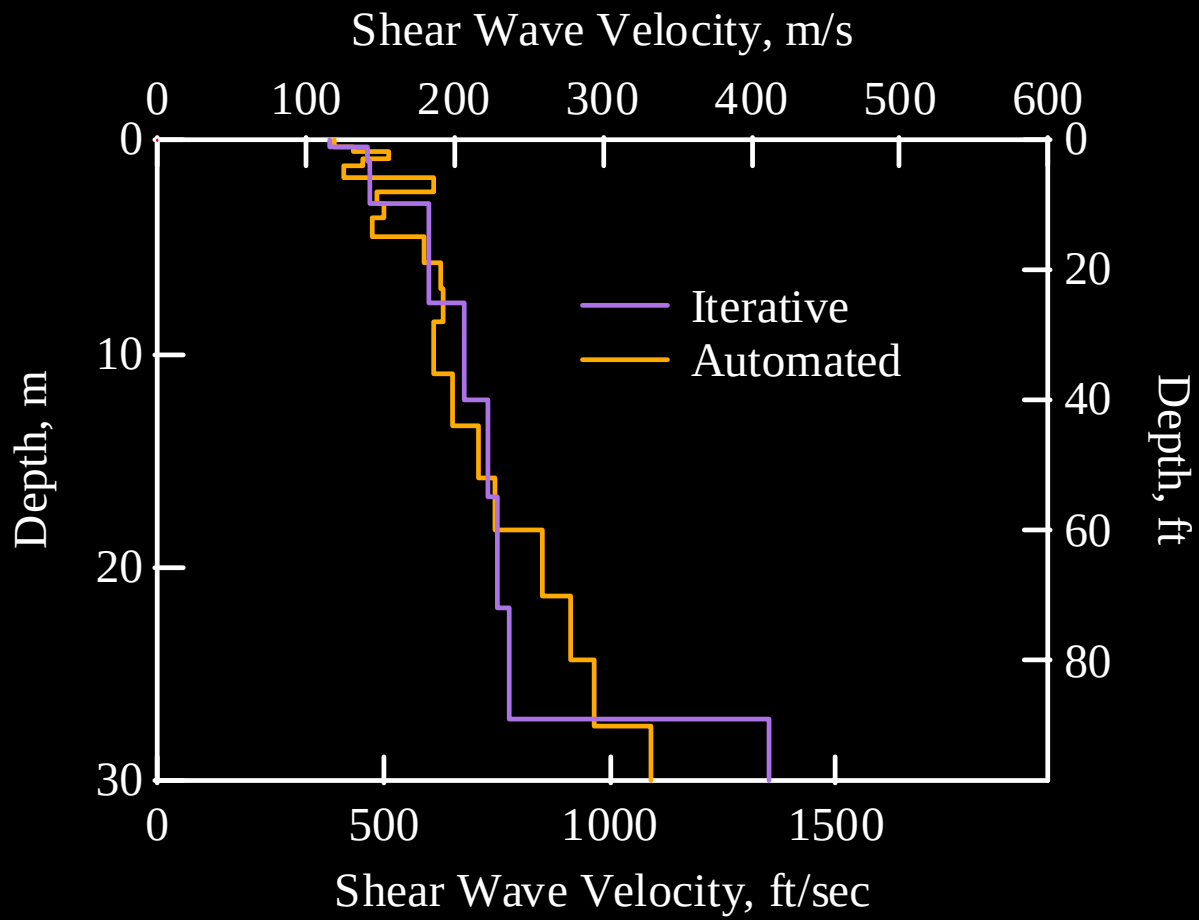
Williams St. Park Automated Theoretical Dispersion Curve



Williams St. Park Automated Shear Wave Velocity Profile



Comparison of Analysis Methods at Williams St. Park



Comparison of Sites with Automated Method